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China Report

SCIENCE AND TECHNOLOGY

No. 156

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CHINA REPORT

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ECONOMIC BENEFIT OF DEVELOPING SCIENCE, TECHNOLOGY STRESSED

Kunming YUNNAN RIBAO in Chinese 4 Jan 82 p 1

[Article by reporter: "Develop Science and Technology, Improve Economic Benefits; the Provincial People's Congress Says It Wants To Place Science at the Same Level of Importance as Policy"]

[Text] Delegates to the Fourth Session of the Fifth Provincial People's Congress said in group discussion that the evaluation of the achievements of science and technology in serving economic buildup noted in the administrative report by Governor Liu Minghui [0491 2494 6540] was correct. To hasten the progress in building the four modernizations in our province, we should place science and technology at the same level of importance as policy.

Delegate Li Peichu [2621 1014 0443] of the Youngsheng County Agricultural Science Institute said: Practice shows that the development of agricultural production relies on: 1) policy, and 2) science. The Zhongzhou Brigade of Liangguan Commune, Yongsheng County, at one time produced high yields of food grains. Later, it neglected scientific planting for a time, and in 1980, its unit yield of paddy rice was only a little over 800 jin. Last year, with the help of the county agricultural science institute, the whole brigade popularized the two superior varieties of zhu hong nian and xue nong No 1, and it implemented the methods of cultivating seedlings under thin plastic sheets, applying chemical fertilizers in the medium soil layer, and applying fertilizers in the surface water layer. Scientific management was carried out from planting to harvesting. While the production cost did not increase, high yields of paddy rice were realized. The average per-mu yield reached 1,024 jin, a net increase of 141 jin over 1980 or 16 percent. Delegate Yang Zaipei [2799 0961 1014] of the Lingchang delegation said, the Gundunzai production team of Hetang Brigade of Mengpeng Commune, Zhengkang County, signed a technical and joint production contract with the agricultural technology station of the county agricultural science institute at Mengpeng Commune and planted scientifically. The total yield of paddy rice reached 187,000 jin, a net increase of 60,848 jin over 1980. The average per-mu yield increased from 368 jin to 545 jin. Scientific planting produced rich results and attracted the enthusiasm of the broad masses of farmers to learn and use science.

Delegates from the industry, transportation, and capital construction fronts also mentioned during the discussion that in implementing the principles of national economic readjustment, scientific research institutes (laboratories) operated by factories have served actively to hasten the development of industrial production and welcome results have been achieved. Delegate Mai Weiling [7796 0251 7792], head of the Design Research Institute of the Yunnan Optical Instruments Plant, said: In the course of readjustment of the national economy our plant was encountering the difficulty of a serious lack of production tasks. The party branch committee at the plant ordered the scientific research institute to develop new specifications for some new products and new varieties according to changes in the market. A group of products suited for marketing was developed and manufactureed, thus promoting the development of production.

9296
CSO: 4008/91

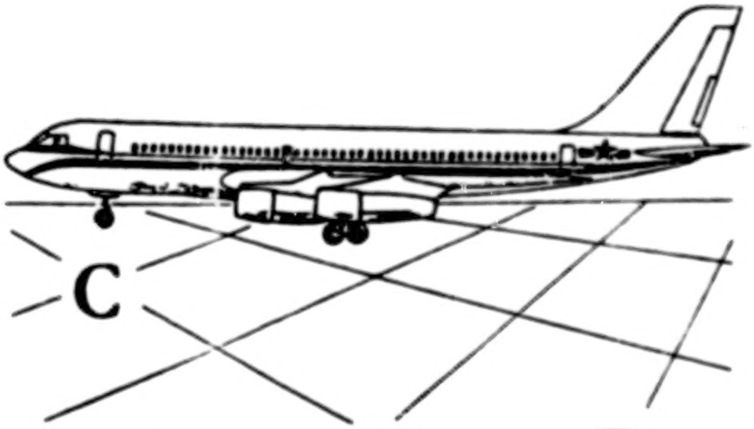
Y-10 COULD SERVE IN CARGO TRANSPORT, EARLY WARNING ROLES

Beijing HANGKONG ZHISHI [AEROSPACE KNOWLEDGE MAGAZINE] in Chinese No 3, Mar 82 p 4

[Text] If the Y-10 goes into service it may have a wide variety of roles. In addition to its use as a passenger aircraft, it can be modified to become an ambulance aircraft (A). In this configuration, it can transport 110 litter patients and 7 medical personnel. It may also be used as a passenger-cargo carrier.

(B). In this mode, its maximum load is 35-40 tons in the form of 12 containers or 7 jeep-type vehicles. When modified as a military transport (C), it can carry a reinforced company of 160 men with their weapons. Still another application is as an early warning aircraft (D).

B



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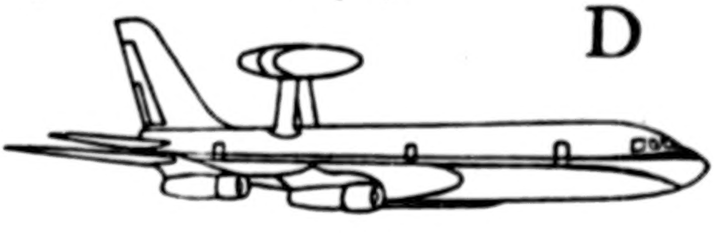

D

CSO: 4008/122

GUIDELINES FOR CONSULTING SERVICES RECOMMENDED

Shanghai WEN HUI BAO in Chinese 3 Dec 81 p 2

[Article: "Organization and Leadership in Scientific and Technical Consulting Services"]

[Text] On 5 November, this newspaper published a letter from ten technical personnel of a design academy in the city entitled "What's Wrong With Doing Spare-Time Design Work for Plants?" and one entitled "Notes on a Reporter's Investigation."

The publication of these two letters provoked a considerable response in the research and design departments and industrial enterprises, and called forth differing opinions regarding the correct way of handling scientific and technical consulting services, the way to bring the enthusiasm of scientific and technical personnel into play, the best ways of reorganizing labor discipline and enterprise management and the like. The differences of opinion reflected some differences in understanding of the relevant regulations and procedures in this area and the fact that some of the regulations and procedures themselves are imperfect; in addition, in some cases new situation and problems with which we have insufficient experience have arisen and must be further investigated.

Scientific and Technical Consulting Services Are Necessary for Economic Construction

The provision of scientific and technical consulting services is an implementation of the policy that science and technology must serve economic construction, and is an important way of stimulating the development of science and technology in coordination with the economy and society. Many universities and research institutes in the city have already begun providing technical consulting services. According to incomplete statistics, in the last 2 years this city's municipal, district or county scientific and technical societies have performed scientific consulting services in more than 2,000 cases, principally including: provision of scientific and technical schemes and technical substantiation for the relevant departments' or localities' development programs, plans and construction projects, and for comprehensive resource development; provision of technical and economic information, technical forecasting and market forecasting to relevant departments, localities and industrial

industrial and mining enterprises; organization of key technical efforts and consultation on technical renovation for industrial and agricultural production units; and the provision of technical consultation to scientific and technical management departments regarding evaluation of scientific and technical results, their dissemination, and exchange of experience concerning them. The practice of scientific and technical consultation has made an excellent contribution to the four modernizations. In 1979, the Xiexin Woolens Mill in this city carried out an extensive reproduction project with state investments (including some foreign compensatory trade funds), but the program experienced difficulty because it could not solve the key problem of wastewater treatment. The plant invited six or seven design units to submit designs, but for various reasons the designs were not received. Subsequently, with the assistance of the Jing'an District Scientific and Technical Society, it solved its problem through scientific and technical consulting services. The city currently has many medium and small sized plants which wish to carry out technical renovation like that at the Xiexin Woolens Mill but lack the technical manpower; the problem is particularly acute in the light industry and textiles system. Some of the plants require small changes but are not capable of making them. Slicing is still done by hand at one Chinese pharmaceuticals plant, resulting in many occupational injuries; the plant wishes to provide protective equipment but is incapable of doing so. The newly emerging scientific and technical consultation services still have not attracted serious attention from all relevant quarters, and as comrades at the Xiexin Woolens Mill say, "When living services are inadequate (e.g. when food and clothing are hard to get) people sympathsize but when technical services to industrial production are inadequate, it's hard for people to symphasize." This makes it clear that scientific and technical consultation services are presently far from sufficient and that they must be enthusiastically encouraged and given positive support so that they can develop more extensively.

Scientific and Technical Consulting Services Must Have a Specific Scope

Naturally, scientific and technical consulting services must have a specific scope. This city's experience in the past 2 years indicates that they should involve the provision of technical substantiation or technical design for medium and small-scale process and product innovations. Because surveys for capital construction and construction design involve stringent technical and quality requirements, the regulations of the relevant state departments do not permit design by individuals or spare-time design work by technical personnel, nor do they permit uncertified units to perform design work. Individual construction units may rely on their own technical manpower or on scientific and technical consulting and technical services for surveys and design for some non-capital construction projects involving renovation or modernization, technical measures, major overhauls and various types of maintenance projects, they must intensify management and stringently assure quality.

Technical Consultation Services Must Be Carried Out Under Suitable Leadership

Scientific and technical personnel's use of working time or spare time to participate in scientific and technical consulting activities, provided that they have performed their regular job responsibilities, can give they them a wider scope for the use of their technical skills and concentrate the [illegible] of [illegible] talents' brain power," which benefits the four modernizations and all of society and accordingly should be encouraged, but these activities must be carried out in organized fashion and with leadership. The [illegible] design academy technical personnel had participated in the design of the [illegible] equipment for the Xiexin Woolens Mill's wastewater treatment process at the invitation of the Jing'an District Scientific and Technical Society and had helped the plant solve a difficult production problem; such activism is good. But they failed to make a report to the leadership of their own unit so that it could generally organize their work, which was a deficiency. The Jing'an District Scientific and Technical Society failed to contact the technicians' organization before issuing the contract to them, which was a failure to go through the proper procedures. Jing'an District Scientific and Technical Society should first have discussed the technical consulting services project with the design academy and secured the agreement of its leadership, and the design institute and the Xiexin Woolens Mill should have signed a contract, thus assuring that all procedures were complied with. In the future, when scientific and technical consulting services are provided, the scientific and technical society generally should not act as a contracting organization, but should establish close relations with the relevant scientific research units and major specialized academies, gain their support, and let them be the parties to the contract; the relevant scientific research institutes and major specialized academies should treat technical consulting services as part of their work, actively support the work of the scientific and technical societies, and help the industrial enterprises solve their problems. This kind of effort on both sides will enable scientific and technical consultation services to be performed better.

Regulation Procedures Should Be Worked Out to Provide Guidance

According to relevant regulations of the municipal government, when enterprises under ownership by the whole people or under collective ownership within or outside the city request employees of sister organizations with technical or specialized skills to carry out equipment overhaul and installation, to provide technical guidance, to furnish design or process data or to train technical personnel, they must follow the requisite organizational procedures in bringing in the subject and must sign an economic contract; where possible the relevant enterprises should give them active support. Although this regulation primarily relates to employees of industrial enterprises, until specific unified regulations and procedures are in existence, the provision of scientific and technical consulting services also should be carried on in compliance with them. This will prevent contradictions with the reorganization of labor discipline and enterprise management which are currently under way. As regards compensation to scientific and technical personnel taking part in the provision of consulting services, we have learned that when the city and district scientific and technical societies carry out scientific and technical consultation work, most projects are done free of charge, and compensation is provided for only a small number of projects, with a certain proportion being paid to the scientific and technical personnel. This is compensation for the labor expended by these personnel and is similar to the contribution fee paid to them by the publishing organizations and the stipend paid to instructors by organizations hiring them to teach courses. It embodies the principle of distribution according to labor. The current problem is that there are no unified standards for this type of compensation. It appears that regulation procedures are needed to govern the scope of scientific and technical consulting activity, the methods and procedures for organizing it, compensation to the scientific and technical personnel for their work and the like, and accordingly we suggest that the relevant departments study the situation and draw up such procedures to provide guidelines, to promote the development of scientific and technical consulting work more effectively and to aid in the development of the four modernizations.

8480
CSO: 4008/55

REGULATIONS FOR MACHINE-BUILDING STANDARDIZATION ISSUED

Beijing BIAOZHUNHUA TONGXUN [STANDARDIZATION JOURNAL] in Chinese No 6, 1981 pp 4-5

[Article: "State Machine-Building Commission Issues Regulations on Strengthening Standardization"]

[Text] The State Machine-Building Commission accords great importance to standardization work, and in order to improve it as part of readjustment, it has issued ten regulations for strengthening standardization work, which were distributed this June to the relevant departments of the State Council and of the provinces, municipalities and autonomous regions for conscientious implementation, with the requirement that the localities and departments draw up specific procedures for strengthening standardization work in accordance with the spirit of the regulations. The "State Machine-Building Commission Regulations on Strengthening Standardization Work" state the following:

Standardization is an important means of organizing the development of modern production and implementing scientific management. Standardization work is an important form of work on the technical base for the entire production structure and for improving economic effectiveness and the quality of enterprise management.

Standardization work in the machine-building industry has made its greatest achievements in the last 2 years. But there are still many problems. The relevant departments do not sufficiently recognize the importance of standardization and do not accord it sufficient importance; standards management and research organizations are not functioning effectively; there are no normal channels for reimbursement of standardization expenditures; the contingent of scientific and technical personnel for standardization is weak; the development and revision of standards is proceeding slowly; because responsibilities are not made clear, standardization is not effectively implemented or strictly overseen; and specialized standards are few in number and are not centralized. These problems are having a serious effect on specialized production and on technical and economic results in the machine-building industry.

Standardization is an extremely important basic activity, and in order to effectively strengthen standardization work in the context of readjustment, we establish the following regulations:

1. The relevant departments must strengthen their leadership of technical standardization work and must include standardization as a major item on the agenda. Deputy ministers and deputy directors overseeing scientific and technical work in the various departments must resolve to make a conscious effort to carry out technical standardization. They must conscientiously implement the "People's Republic of China Regulations on Standardization Management"; under the leadership of the State General Officer of Standards and in keeping with their own specific conditions, every half year they must carry out one inspection of technical standardization work throughout their areas of competence and must submit one brief written report on the drafting and implementation of standards to the State Machine-Building Commission.

2. The technical policy for standardization must be thoroughly carried out, and standaridzation work must be included in the readjustment plan for the machine building industry. The readjustment plan coordinating groups for the various industrial branches under the leadership of the State Machine Building Commission must treat technical standardization work as a major undertaking; in cooperation with the State General Office of Standards, and relying on the relevant members of the State Technical Committee on Standards and the units or organizations designated as responsible for standardization, they must draft technical standards for the various industrial branches. The departments must assign manpower to the drafting of state standards and special technical standards and must gradually revise existing technical standards as special standards. When the state standards or special standards have been drafted and issued, the various branches of industry must immediately act in accordance with them.

3. The relevant departments must produce a practicable technical standards drafting plan this year and organize the relevant research units and enterprises for a major effort to complete drafting of the main technical standards within approximately 5 years. Before drafting the regulations, they must, under the unified coordination of the State General Office of Standards, draft a standardization system table as a reference for drawing up the regulations. They must first draft integrated, basic technical standards. Already-drafted technical standards (state standards of departmental standards) must be analyzed and revised. Following a stocktaking, by the end of August 1982 they must designate which standards which are usable, which are usuable after revision, and which should be abandoned. All standards drafted in the future must all have a specified term of validity; every 3 to 5 years, standards must be reviewed and either affirmed, revised or abolished. The status of standards drafting or revision should made one of the indices by which enterprise or research institute plan fulfillment is evaluated.

Active cooperation should be given to the State General Office of Standards in the drafting of state standards.

4. The departments must see that standardization management organs (offices or bureaus) and research organs (in general, a ministry should have a standards research institute and a general office should have a standards research office) are operating effectively. They should have competent, dedicated leaders and should be sufficiently well staffed with specialized technical personnel who have some practical experience (dispersed standardization

technical personnel must as far as possible be returned to their home units), and everything possible must be done to maintain personnel stability. The standards engineers should account for 1 to 3 percent of total number of technical personnel in each unit (plant or research institute), with a higher percentage in units with designated responsibility for standardization work. An active effort must be made to improve the working conditions of standards research organizations. In order to speed up the work of drafting and revising standards, the departments may organize existing technical personnel in their subordinate units to take part in standards drafting work and may undertake the appropriate personnel, organization and task assignment measures. Standardization engineers fall within the ranks of scientists and engineers, and must receive commensurate treatment.

5. The relevant departments must choose key research institutes and enterprises and must make maximum use of available equipment and personnel in the specialized responsible organizations of the standards and metrology system to and install the necessary testing equipment and instruments in order to make them into evaluation, examination and testing centers for products of the various industrial branches. The enterprises too must be supplied with suitable testing equipment so that they can conduct strict inspection of their own plants' products in accordance with technical standards. The expenses for this work should be handled as expenditures for technical measures.

6. In drawing up the technical standards, active use must be made of international standards and progressive foreign standards; and account must be taken of the country's resources, energy conditions and current industrial and technical standards, so as to assure that the standards are technically advanced, economically rational and safe and reliable. The departments should send comrades engaged in bona fide standardization work to participate in conferences of international standardization organizations. An active effort should be made to enf import, translate and publish and test and certify* international standards, and international standards and commonly-used foreign technical standards should be conscientiously investigated and actively adopted.

7. The work of drafting technical standards should be involved in the departments' five-year scientific and technical development programs and annual science and technology plans and in the periodic assignments that are handed down. Expenditures for development and testing of important standards should be handled as scientific research expenses. Application should be made to the State General Office of Standards and the cognizant departments for supplementary funds to cover the cost of drafting and revising standards. Technical standards which have been approved should be treated as scientific research results and are eligible for awards in accordance with the applicable regulations.

8. Standardization work related to technology import should be intensified. Technical standards (which generally include technological advances) are an important component of the importation of advanced foreign technology. Standardization should be carried on during investigation, negotiations for, translation, and practical assimilation and production of imported technology. The cognizant departments should organize unified collection, translation and analysis of international standards and relevant enterprise standards. Provided

that it can be assured that the quality of the imported technology and product quality will not be lowered, active use should be made of this country's national and special standards (departmental standards) to carry out effective substitution or experimental development of domestically produced materials. Otherwise it will be necessary to adopt imported standards (foreign national or enterprise standards) and international standards.

A major effort must be made to absorb imported advanced technical standards and to continuously raise our country's standards. All cognizant departments which import technology should take responsibility for organizing the coordinated supply of standardized, commonly-used spare parts and components for imported technology.

9. Technical standards for electromechanical products intended for export must be revised or newly drafted and strictly implemented.

In the case of electromechanical products which are already on the international market or are about to enter it, our country's existing standards should be revised in accordance with international standards or commonly-used advanced foreign technical standards so that they are not inferior to the prevalent foreign products in capabilities and quality, are interchangeable with them, and are adapted to the requirements of the international market, so as to increase their competitiveness. If it is unsuitable or temporarily impossible to use unified standards for both exported and domestically-sold products, the departments should, in cooperation with the relevant branches of industry, organize expeditious drafting of temporary special standards for export products and report their proposals to the State Machine-Building Commission and the State General Office of Standards. When enterprises produce electromechanical products for export, they must strictly observe the export technical standards to assure the quality of the export products.

10. When the production sections of the relevant departments organize production, they must conscientiously implement all technical standards. Technical standards that have been issued and are in effect have the force of law, and all products which do not comply with them are substandard. No products which have not been produced in conscientious compliance with the various technical standards may be rated as top-quality products or may be eligible for quality honors and material awards. All new electromechanical products must be produced in accordance with the "Procedures for Inspection and Management of Standardization of New Electromechanical Products."

The production authorization regulations which are about to be drafted must specify that production of any products not produced in accordance with the state standards or special standards (departmental standards) must cease, and that production authorization certificates must not be issued for them. The funcational organizations overseeing technical standards are the quality management departments of the departments. The departments should also designate certain evaluation and testing centers to carry out standards inspection of relevant products and to report their results in the proper publications.

8480
CSO: 4008/97

SHAANXI GOVERNOR PROPOSES TO STRENGTHEN APPLIED S&T RESEARCH

Xian SHAANXI RIBAO in Chinese 31 Dec 81 p 1

[Article: "Yu Mingtao [0060 2494 3447] Proposes To Strengthen Research in Applied Science and Technology and Popularize Achievements of Scientific Research"]

[Text] Provincial Governor Yu Mingtao [0060 2494 3447] said in his administrative report: The scientific and technological, cultural, educational and public health fronts have mobilized the enthusiasm of the broad numbers of intellectuals and the masses of workers by further implementing the party's various policies and have realized new achievements.

Yu Mingtao said: the Scientific and technological forces have concentrated their efforts on readjustment, insured the key points, strengthened the study of applied science and technology, and popularized the achievements of scientific research. Last year, 409 important scientific and technological achievements were realized. Among them, two received the national invention award, 134 were cited by the provincial people's government, and 105 were popularized. This year, over 200 more scientific and technological achievements were realized. The scientific research agencies have restored and established normal order through reorganization. Now, there are already 68 associations and societies of various types with a membership reaching more than 22,000 persons. Academic exchange activities have further developed. Over 7,750 academic papers were exchanged, some of a relatively high standard. As of the end of September, over 66,000 various technical cadres were evaluated and promoted for good performance, and the enthusiasm of scientific and technical personnel was mobilized.

Yu Mingtao said: education, culture and public health continued to develop. The number of students enrolled in higher educational institutions increased 18.8 percent over last year. The number of colleges on television, workers universities and correspondence colleges reached 44, with a student population of over 15,000. The distribution of middle schools and the scale and structure of mid-level education was readjusted. The number of agricultural middle schools and vocational middle schools increased. The quality of education was improved. In public health, reorganization of public health agencies, quality management and control of drugs and medicines, prevention and control of local diseases, female and child hygiene and health work were strengthened. Planned parenthood realized new achievements. The natural population growth rate basically remained at the originally established 0.9 percent control goal. Culture, physical education, cultural relics, broadcasting, television, journalism, and publishing all realized new developments. Tourism also developed very quickly. From January to November, the number of foreign tourists increased by more than 70 percent over the same period last year.

9296
CSO: 4008/91

APPLIED SCIENCE

REMOTE CONTROLLED AIRCRAFT FOR MINERAL PROSPECTING TESTED

Xian SHAANXI RIBAO in Chinese 30 Dec 81 p 1

[Article by Wang Zhenqin [3679 2182 0530]: "Experiment Using an Unmanned Remote-Controlled Airplane To Measure Magnetism and Carry Out Mineral Prospecting in Mountain Regions Is Successful for First Time"]

[Text] An experiment using an unmanned remote-controlled airplane for aerial measurement of magnetism and prospecting minerals in mountain regions was successfully carried out recently by the Provincial Geological Bureau in the Shimen Mountain region.

This experiment was conducted from two localities on top of high mountains by remote control "relay." An unmanned geophysics prospecting airplane under the control of telemetric equipment on the ground flew over mountain peaks, and rivers and went straight to the operational zone 11 kilometers from the launching site at 1,500 to 1,800 meters above sea level. After entering the operational zone, control of the unmanned airplane was taken over by the control station in the operational zone. The airplane automatically carried out a planar scanning type parallel telemetric network for aerial telemetry of magnetism, and at the same time, the telemetric data of aerial magnetism measured were accurately transmitted to the ground in a timely way, and the data were displayed in analog form and digital printout and recorded. The three "relay" control experiments conducted this time successfully completed all procedures of relaying, operation and retrieval.

Through this experiment, experimental results of two airplanes and two sets of aerial telemetric systems were also obtained; they successfully obtained decisive and important references for the use of remote-controlled airplanes over most of the Qinbashan region in carrying out various types of geophysical prospecting, aerial photography, infrared remote sensing and meteorological studies, national defense construction, and soil preservation operations.

9296
CSO: 4008/91

BRIEFS

MICROWAVE COMMUNICATIONS NETWORK--Daqing, 19 Mar (XINHUA)--Daqing Municipality has recently completed and put into operation a microwave relay urban telecommunications network with crisscross exchanges. All the equipment used in the network 15 made in China. With microwave relay as primary means of transmission, the network meets the requirements of various telecommunications, including industrial television, data transmission and special control lines [diao du zhuan yong xian 6148 1653 1413 3938 4848]. It has created favorable conditions for conducting closed-ciruit television education and holding television and telephone conference. It will play an important role in improving the production management and control of the oilfield. [Text] [OW192110 Beijing XINHUA Domestic Service in Chinese 1217 GMT 19 Mar 82]

REMOVING TV ANTENNAS--During its struggle against corrosive influences, Kaiping County has carried out propaganda and educational work in depth. The county's party members and leading cadres at all levels have set examples, and extensively mobilized the masses to resolutely implement the higher authorities' directive on taking down the ultrahigh frequency antennas, also known as fishbone antennas, which are used for receiving Hong Kong television programs. By 20 March, a total of 822 fishbone antennas had been taken down, which account for 91 percent of all the fishbone antennas installed in the county. [Text] [HK240653 Guangzhou Guangdong Provincial Service in Mandarin 2350 GMT 23 Mar 82]

CSO: 4008/129

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TITLE: "On Heat Transfer of the Suspended Ebullition State"

SOURCE: Beijing SHUINI [CEMENT] in Chinese No 2, 10 Feb 82 pp 2-7

ABSTRACT: Suspension preheated kilns began to appear in the 50's and the way heat is transferred between the raw material in the cement kiln and the air current has thus been basically altered. The material is in a suspended state to increase greatly the area and the coefficient of heat exchange. The production of the kiln increases and the heat consumption of the clinker decreases, from the 1300-1500 Kcal./kg of clinker (wet method) to 725-850 Kcal./kg. Moreover, the useful life of the refractories is lengthened while air pollution is reduced. This paper explains the advantages of this type of modernized kilns, equations for calculating the heat transfer area, the thermal conductivity, and the fluidized bed. There is no mention of adoption of this technology in China, however.

AUTHOR: HE Qiongyu [0149 8825 3842]

ORG: Construction Material Research Academy

TITLE: "Method of Pozzolanic Characteristic Test -- Research on the Application of ISO/R863-1968"

SOURCE: Beijing SHUINI [CEMENT] in Chinese No 2, 10 Feb 82 pp 7-12

ABSTRACT: In China, the lime absorption method is mostly used to test the pozzolanic characteristic of a cement mix, using mg/g to indicate activity. This method in fact does not reflect the characteristic of the cement added. In 1977, the academy in formulating standards of cement and coal ash in concrete, recommended the international standard of using the ISO/R862-1968 method to determine the pozzolanic characteristic of portland-pozzolana cement. Since 1980, in the process of revising the standards for pozzolanic materials, the author and colleagues have carried out more studies on the ISO method. Combined with the concrete condition of cement analysis in China, in the research process, the $KMnO_4$ method was replaced by the EDTA method to determine CaO. As a part of preparation for general extension of the ISO method, this paper introduces its theory, the test procedure, and an evaluation of its test results.

6248
CSO: 4011/36

Construction

AUTHOR: CHENG Xi [4453 1585]

ORG: Chairman, Construction Economics Committee

TITLE: "Speech at the National Construction Industrialization Experience Exchange and Scientific Discussion Meeting"

SOURCE: Beijing JIANZHU JINGJI YANJIU [RESEARCH IN CONSTRUCTION ECONOMICS] in Chinese No 1, 15 Feb 82 pp 2-11

ABSTRACT: The National Construction Industrialization Experience Exchange and Scientific Discussion Meeting, under the joint auspices of the National Bureau of Construction and the Chinese Society of Architecture Construction Economics Committee, was held in Changzhou City of Jiangsu Province on 11-18 Nov 81. This speech was delivered on the 8th day of the meeting. The author briefly reviewed the history of China's attempt at industrializing since the 50's, through the decade of disturbance, and since 1976. Lessons learned from the recent years are summarized as being that in order to industrialize it is necessary to adopt suitable technologies gradually according to local conditions and it is necessary to emphasize the construction of residential dwellings. With regard to the future, the author believes that (1) There must be a firm determination that industrialization is the direction of development for the future; (2) There must be a reform of the brick and mortar concept and in its place, such new building systems as large modules, large boards, and blocks must be perfected; (3) Various types of prefabricating plants must be reorganized to develop commercialized production of large construction parts and structural members; (4) The relationship between standardization and variety must be correctly handled to create new architectural styles;

[continuation of JIANZHU JINGJI YANJIU No 1, 1982 pp 2-11]

(5) Strengthen production management and develop comprehensive economic analyses; (6) Strengthen scientific research to serve the development of construction industrialization; (7) Strengthen leadership and planning to improve the level of construction industrialization.

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TITLE: "Strengthen Research on Construction Economics to Improve the Economic Benefits of Construction"

SOURCE: Beijing JIANZHU JINGJI YANJIU [RESEARCH IN CONSTRUCTION ECONOMICS] in Chinese No 1, 15 Feb 82 pp 37-39

ABSTRACT: Following the example of Premier ZHAO Ziyang's report of governmental work delivered at the 4th plenum of the 5th People's Congress, the author presents his viewpoints concerning ways of improving the economic benefits of the construction industry. On the basis of concrete conditions, after the leftist errors have been rectified, the theoretical research in construction economics should pursue the definition of the subject, the contents of construction industrialization, and the fact that as an independent department of material production, the business of construction is merchandise economics. In summarization, it is urgent that solutions must be found for the following: (1) Problem of evaluating construction; (2) Problem of evaluating 3-waste utilization, and land and energy conservation; (3) Problem of calculating the economic benefit of shortening the workday; (4) Problem of evaluating investment cost of useful life [of structures.] (5) Problem of predicting effects of labor, material, and resources development on cost; (6) Problem of calculating cost distribution between land and engineering projects in terms of highrise buildings.

AUTHOR: LI Huiru [2621 1920 1172]

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TITLE: "On the Problem of Energy Conservation in Construction"

SOURCE: Beijing JIANZHU JINGJI YANJIU [RESEARCH IN CONSTRUCTION ECONOMICS] in Chinese No 1, 15 Feb 82 pp 45-48

ABSTRACT: Energy crisis has become a world-wide problem in recent years. China has had the problem continuously over the past decade. Although the per capita consumption of coal is only 0.6 ton, 2/3 less than the world average, the amount of coal production remains roughly the same as its consumption. According to preliminary estimates, it is not possible to increase the production of energy over a large scale before 1985 while the demands for energy for industrial, agricultural and civilian uses will continue to increase before then. The construction industry consumes about 1/4 to 1/5 of the total energy consumption of the country; therefore, energy conservation of the construction industry is extremely important in resolving the problem of energy shortage. Ways of conserving energy in reducing unit energy consumption for producing construction materials, such as steel,cement clinker, etc. and in designing buildings that are economical to heat, etc. are discussed.

6248
CSO: 4011/31

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TITLE: "On the Existence of Regular Solution for Equations of the Parabolic Type with Discontinuous Initial and Boundary Conditions"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 1-8

EXCERPT FROM ENGLISH ABSTRACT: In this paper the existence of solvability for the following generalized boundary value problems is discussed.

Let $\mathcal{L}$ be the parabolic differential operator defined in the region $\Omega\times[0, T]$ in an $n+1$ dimensional space and Ω be the bounded region with a bound S in an n-dimensional Euclidean space E_n. The problem of whether there exists a regular solution for the second order parabolic equation

$$\mathcal{L}(u) = \sum_{i,j=1}^{n} a_{ij}(P,t)\frac{\partial^2 u}{\partial x_i x_j} + \sum_{i=1}^{n} b_i(P,t)\frac{\partial u}{\partial x_i}$$

$$+ c(P,t)u(P,t) - \frac{\partial u}{\partial t} = f(P,t) \qquad (1)$$

on $\Omega\times[0, T]$ satisfying the following initial and boundary conditions is taken into consideration.

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 1-8]

If $\varphi(P)$ is continuous at point P, then

$$\lim_{t\to 0} u(P,t) = \varphi(P) \qquad (2)$$

If $P\in\Omega$ (or $P\bar{\in}\Omega$) and approaches the point $Q\in S$ along the conormal of S, then

$$\lim_{P\to Q} u(P,t) = \psi(Q,t) \quad \cdots\cdots\text{(first boundary value problem)} \quad (3)$$

$$\lim_{P\to Q} L_P u(P,t) = \psi_1(Q,t)\cdots\cdots\text{(mixed boundary value problem)} \quad (4)$$

almost everywhere over S, where L is referred to as the operator in §1. Of the functions mentioned above, $\varphi(P)$ is piecewise continuous on $\bar{\Omega}$, and $\psi(Q,t)$ and $\psi_1(Q, t)$ are the arbitrary Lebesque integrable functions with respect to Q over S and also continuous with respect to t. With the aid of both the double layer and the single layer potential functions, these problems can be reduced to the linear integral equations solved with definite conditions including Lebesque integrable free terms. As a consequence, the existence of regular solutions for the problems with interior and exterior boundary values is proved. In this paper the first interior boundary value problems are emphatically discussed in detail.

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TITLE: "The Dispersion of Silica Fine Particles by Acidified Sodium Silicate and Ferric Nitrate"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 9-20

TEXT OF ENGLISH ABSTRACT: $Na_2SiO_3 \cdot 9H_2O$(I), $Na_2SiO_3 \cdot 9H_2O + HNO_3$(II) and $Na_2SiO_3 \cdot 9H_2O + HNO_3 + Fe(NO_3)_3 \cdot 9H_2O$(III) solutions, used as dispersing agents, were tested for their relative dispersion powers acting on fine silica particles in which the dispersing agents II and III were prepared at a pH value of 3. Each of them was added to the fine silica pulp of pH 10.5 regulated by Na_2CO_3 and their dispersion powers were measured by sedimentation. It has been found that the dispersion powers are III > II > I in order. The metallurgical results of direct flotation tests of siliceous hematite ore, using tall oil and diesel oil as the collectors for the hematite, are also in the same order (III > II > I). The higher dispersion powers of II and III are attributed to the formation of the protective colloids adsorbed on the silica surface as observed by electronmicroscopic examination. The ζ-potentials of quartz are also measured and considered to be related to the adsorption of protective colloids.

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TITLE: "An Analysis of the Mechanism of Pin Timbering"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 21-31

EXCERPT FROM ENGLISH ABSTRACT: As an effective safety measure taken to prevent rock falling in roofed tunnels or stopes, pin timbering has been widely used up to the present. Based on the simplification and reformation of the elasticity expressions proposed by J. Dundurs and Flamant, this paper contributes the theoretical formulas for the superimposed stress fields due to pin timbering with a single roof bolt, a group of roof bolts and a roof bolt truss, respectively. The photoelastic experiments presenting the stress distributions in rock masses around the anchored roof bolts have been carried out and their results are compared to the theoretical values calculated by a computer with the above-mentioned formulas, thus explaining the rock suspension mechanism of pin timbering. Such a comparison shows that the explanation of the rock suspension mechanism of pin timbering tallies with the actual situation.

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TITLE: "On the Evolution of Softening Melting Zones and Their Aerodynamic Properties in a Blast Furnace"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 33-40

TEXT OF ENGLISH ABSTRACT: The temperature field in a blast furnace is one of the decisive factors in both the evolution of softening melting zones and their aerodynamic properties and, moreover, it is closely related to the distribution of gas flow. In this respect, the operating regulation is of significance and affects the distribution of gas flow so as to vary the temperature field in a blast furnace and to be able to form the softening melting zone with different shapes. The operating regulation for the lower part of a blast furnace, such as the air flow control, the tuyere diameter and the length of the tuyere nozzle inserted into the hearth, are particularly considered in connection with the evolution of softening melting zones according to the variation of the gas streamlines within the charge layers determined by the model experiments under different conditions. Furthermore, the functional relation between the permeability index of softening melting zone (ξ/H, i.e., the gradient of gaseous resistance coefficient), the number of coke slits (n) and their

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 33-40]

thickness (h) and width (L) and the voidage of the coke slit (ε) are derived by using the dimensional analysis method with the data of model experiments. It is shown as follows:

$$\xi/H = KL^{0.103}n^{-0.46}h^{-0.93}\varepsilon^{-3.74}$$

The physical meaning of the permeability index ξ/H is qualitatively discussed as well.

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TITLE: "The NDRF Busy Control System--A Method Adopted to Eliminate the Impairment due to the Capture Effect on the Single-channel, Multi-address, Angular Modulation Communication System"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 41-48

TEXT OF ENGLISH ABSTRACT: A review of the literature reveals that all the single-channel multi-address communication systems usually apply angular modulation and, therefore, the impairment in the communication net through the capture effect is unavoidable. This paper offers a suggestion for eliminating such an impairment--the NDRF (noise detection, main station relaying, follow-up instruction) busy control system. An analysis is made in detail for the NDRF system, especially about the noisiness of the FM demodulator and the principle of noise detection which are expressed by formulas. Experiments show that the theoretical calculations are fairly consistent with their results and the NDRF system can be designed theoretically according to these derived formulas. The suggestion, therefore, shows greater practical value because it is verified that the NDRF can basically eliminate the impairment due to the capture effect on the single-channel, multi-address, angular modulation communication system even though its structure is very simple.

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TITLE: "On the Measurement Error and Limit of Acceptance"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 49-66

TEXT OF ENGLISH ABSTRACT: Measurement errors have an effect on the acceptance check for machine parts inspection, thus false rejection and false acceptance take place unavoidably to a certain degree. The probabilities of false rejection and false acceptance vary with the part's dimensions inspected and the different distributions of measurement error, such as the uniform distribution, the normal distribution and both in combination. A group of formulas for evaluating these probabilities is developed in this paper and, based on that, several analytical graphs are plotted to point out the efficient measures taken to reduce the probabilities of false rejection and false acceptance. The probabilities of false rejection and false acceptance, respectively, are expressed as follows:

$$n_A = 2\int_{\left(\frac{T}{2}-a-A\right)}^{\frac{T}{2}} \varphi_p(x) \left[\int_{\left(\frac{T}{2}-x-A\right)}^{\infty} \varphi_m(y)dy\right]dx,$$

$$m_A = 2\int_{\frac{T}{2}}^{\left(\frac{T}{2}+a-A\right)} \varphi_p(x) \left[\int_{-\infty}^{\left(\frac{T}{2}-x-A\right)} \varphi_m(y)dy\right]dx$$

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 49-66]

where T is the manufacturing tolerance of the workpiece;
u is the measuring uncertainty;
A is a value reduced from the limits of manufacturing dimensions such that the acceptable limit is decided.

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TITLE: "A Reasonable Design Calculation of the Chamber Profile of Sliding-vane Rotary Flow Meters"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 67-76

TEXT OF ENGLISH ABSTRACT: Briefly introducing the principle of operation of the sliding-vane rotary flow meter, a reasonable design of the chamber profile in this kind of flow meter is suggested in this paper with the intention of meeting such technical requirements as higher metering accuracy and less counting loss, wider metering range, less pressure loss, lower vibration and noise, steady rotation and less metering error due to the viscous property of the fluid metered. For the reason given above, the cycloid, taken as a transition curve of the chamber profile connecting two arcs with different curvature radii, is a substitute for the elliptic curve proposed in an earlier paper, thus preventing the impulse due to the radial acceleration caused by the elliptic curve. The theoretical and practical formulas of the chamber profile are shown, and the oscillating angle (pressure angle) λ and

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 67-76]

minimum width of the sliding-vane are also given. Finally, the possibilities for the smooth motion of the sliding-vane and for the use of form milling to manufacture the chamber profile are also discussed.

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TITLE: "The Bending Vibration Factor of Vibrating Conveyers and Its Application in Design"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 77-88

TEXT OF ENGLISH ABSTRACT: This paper advances a new concept, BVF--bending vibration factor, for the purpose of checking the bending vibration of a vibrating conveyer similarly to checking its strength through a stress calculation in design. The BVF may be expressed as

$$c = |a^*/A|$$

where a^* is the maximum amplitude of the bending vibration and A the amplitude of parallel motion in the direction perpendicular to the axis of the conveyer trough. The allowable value of BVF, which may be applied to judge the reasonableness for designing a vibrating conveyer, is proposed to be smaller than 1/5 ~ 1/4 and no larger than 1/3 ~ 1/2 in general. As for the problem of calculating the natural frequencies and their vibrational responses under the bending vibration for a vibrating conveyer, the transfer matrix method and the finite element method are

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 77-88]

applied to the bending vibrations with single-mass and multi-mass respectively. Subsequently, the source programs of EBVA and EBVB are also made correspondingly with FORTRAN-IV-H. It seems probable that the use of BVF is convenient for checking the bending vibration that usually is a problem in dealing with design.

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TITLE: "On the Lateral Force and Optimum Off-centering of the Smaller Roll in Asymmetrical Rolling"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 89-97

EXCERPT FROM ENGLISH ABSTRACT: The asymmetrical rolling of metal studied here means that the workpiece is rolled between two rolls which are significantly different in diameter but rotate with the same peripheral velocity. The principal advantages of such a rolling process are the abilities to reduce the rolling pressure considerably and to save energy.

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TITLE: "New Formulas for Calculating the Pressure under Forging Reduction"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 99-113

EXCERPT FROM ENGLISH ABSTRACT: New formulas for calculating the pressure under forging reduction in cases of the deformation of cylindrical specimens and the plate with planar deformation are both proposed here. These formulas are derived on the assumption that the approximately simplified distortion-energy condition of plasticity proposed in earlier paper is replaced by the more precise one. In addition, the contact surface is zoned according to the different frictional rules. The values of the pressure under forging reduction calculated by these formulas are more accurate than those calculated by the prevailing Unksov's calculating method based on the assumption of the simplified condition, and it is proved that the latter can make an error even greater than 20 percent. For general cases, i.e., when the specimen is a plate with non-planar deformation, the pressure deforming the specimen under forging reduction may be calculated by use of the "zoned method" proposed, and the results are closer to the measured values. With the charts plotted from the calculated results, such a method renders the calculation of the pressure under forging reduction much more convenient.

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ORG: All of the Metals Teaching and Research Group

TITLE: "A Theoretical Consideration of Formation Conditions of Granular Bainite in Microalloyed C-Mn Steel"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 115-124

EXCERPT FROM ENGLISH ABSTRACT: An attempt has been made to semiquantitatively indicate the dependence of the structure of the C-Mn steel bearing microelements V and Ti on the transformation conditions through a dynamic analysis of the formation of granular bainite. This paper offers a concept about the critical conditions of the formation of granular bainite on the basis of experiments and metallographic examinations when the samples were isothermally treated for different times and cooled continuously, i.e., the critical austenite grain size (diameter) d_c, the critical isothermal treating time t_c and the critical cooling rate v_c. They are derived from the fundamental theories of physical metallurgy.

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TITLE: "Recent Developments in Material Science and Engineering"

SOURCE: Shenyang DONGBEI GONGXUEYUAN [NORTHEAST INSTITUTE OF TECHNOLOGY] in Chinese No 4, Dec 81 pp 125-144

TEXT OF ENGLISH ABSTRACT: Four problems concerned are briefly discussed.
1. Evolution of material science and engineering.
Starting with the early man-made implements, a historical review of the development of materials is made. As a subject, the evolution of material science and engineering is taken into consideration as associated with the development of materials. Three main fields of modern production of materials and their application are analyzed:
--unceasingly broadening the scopes of variety of materials;
--exploring the properties of various materials;
--developing the forming processes.
The correlation between material research and material application and the correlation of research work between non-ferrous metal and ferrous metal are also briefly stated.
2. Present priorities researched on material science and engineering.
According to the statistical data by Cohen about nine fields of application of the

[Continuation of DONGBEI GONGXUEYUAN No 4, Dec 81 pp 125-144]

influential materials in the United States, a priorities' analysis is given to the recent research projects on the development of variety of materials and their properties and processing methods.
3. New trends of the following research works of material science and engineering:
--fracture mechanism and the controls of microstructure;
--superplasticity;
--shape memory effects of metals;
--superconductive materials;
--composite materials;
--ceramic and glass materials;
--space materials;
--developing metal processing methods;
--corrosion of metal materials.
4. The development of education in material science and engineering:
--a brief historical retrospect;
--fundamental courses of education;
--unbalanced tendencies in education;
--development of education in material science and engineering in China.

9717
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TITLE: "Several Theorems Concerning Self-conjugate Matrices and Determinants of Quaternions"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 1-7

TEXT OF ENGLISH ABSTRACT: Let K be the skew-field of real quaternions. A matrix $A = (a_{ij})_{n \times n}$ over K is called centralizable of the characteristic matrix $\lambda I - A$ can be reduced by some elementary transformations into the following diagonal form:

$$\begin{pmatrix} 1 & & & & \\ & \ddots & & & \\ & & 1 & & \\ & & & \varphi_1(\lambda) & \\ & & & & \ddots \\ & & & & & \varphi_s(\lambda) \end{pmatrix}$$

such that $\varphi_1(\lambda) | \varphi_2(\lambda) | \dots | \varphi_s(\lambda)$ and $\varphi_i(\lambda)$ ($i = 1, 2, \dots, s$) are all monic real polynomials. In this case, the determinant of A may be defined as

$$\|A\| = (-1)^n \varphi_1(0)\varphi_1(0)\dots\varphi_s(0).$$

In this paper, some theorems concerning self-conjugate matrices and determinants of real quaternions are proved.

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ORG: Department of Mathematics

TITLE: "A New Class of Spline Interpolation Formulas with Equidistant Nodes"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 17-25

TEXT OF ENGLISH ABSTRACT: Making use of the spline interpolation theory introduced by I.J. Schoenberg, in this paper we give a new class of spline interpolation formulas with equidistant nodes. Compared with the class of interpolation formulas using the theorem in Schoenberg's paper, under the circumstances of the same degree of smoothness and algebraic exactness, the degree of our interpolation polynomials is lower and, sometimes, the span of our interpolation basis function is shorter.

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ORG: Department of Mathematics

TITLE: " Generalized Difference Methods for the Two-point Boundary Value Problem"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 26-40

TEXT OF ENGLISH ABSTRACT: Consider the two-point boundary value problem:

$$-\frac{d}{dx}\left(p\frac{du}{dx}\right)=f(x), \qquad u(a)=u'(b)=0.$$

Let

$$U_h=\operatorname{span}\{\varphi_1,\varphi_2,\cdots,\varphi_n\} \text{ and } V_h=\operatorname{span}\{\psi_1,\psi_2,\cdots,\psi_n\}$$

be trial and test spaces respectively. Then the generalized Galerkin solution $u_h=\sum_{i=1}^{n} u_i\varphi_i$ is the element of U_h which satisfies

$$\sum_{i=1}^{n-1} u_i B(\varphi_i,\psi_j)=(f,\psi_j), \qquad j=1,2,\cdots,n-1. \qquad (*)$$

where

$$B(u,v)=\int_a^b pu'v'\,dx.$$

The usual difference methods may be derived from the equation (*) by choosing

[Continuation of JILIN DAXUE ZIRAN KEXUE XUEBAO No 1, 1982 pp 26-40]

$$\varphi_i(x)=\begin{cases} 1-h_i^{-1}|x-x_i| & \text{on } [x_{i-1}, x_i], \\ 1-h_{i+1}^{-1}|x-x_i| & \text{on } [x_i, x_{i+1}], \\ 0 & \text{else where;} \end{cases}$$

$$\psi_j(x)=\begin{cases} 1 & \text{on } [x_{j-\frac{1}{2}}, x_{j+\frac{1}{2}}), \\ 0 & \text{else where,} \end{cases}$$

where

$$x_0=a<x_1<\cdots<x_n=b, \quad h_i=x_i-x_{i-1}, \quad x_{i-\frac{1}{2}}=\frac{1}{2}(x_{i-1}+x_i).$$

We define the generalized difference methods by taking φ_i to be the usual Hermite spline functions, and

$$\psi_j(x)=\psi_j^{(l)}(x)=\begin{cases} (x-x_j)^l/l! & \text{on } [x_{j-\frac{1}{2}}, x_{j+\frac{1}{2}}], \\ 0 & \text{else where.} \end{cases}$$

The error estimation is investigated for the case φ_i being taken as cubic Hermite splines and $\psi_i=\psi_i^{(0)}, \psi_i^{(1)}$. The accuracy and computational economy of the generalized difference methods have been shown by theoretical analysis and a numerical example.

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TITLE: "The Estimates of Continuous Dependence of Cauchy Problem for Differential Equations with Constant Leading Coefficients"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 41-52

TEXT OF ENGLISH ABSTRACT: In this paper we investigate the estimates of continuous dependence of the solution of the Cauchy problem for partial differential equations of an arbitrary type with constant leading coefficients. We first establish a basic estimate for the general partial differential operators with constant coefficients by means of L. Nirenberg's extensional inequality of L. Hormander's inequality for these operators, and then obtain the local estimates which are characteristic of Holder's continuous dependence of the solution on Cauchy data in several different measures for the problem under consideration. These estimates correspond to Hadamard's three circle theorem for analytic functions.

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TITLE: "Unbounded Decomposable Operators"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 53-65

TEXT OF ENGLISH ABSTRACT: In this paper we introduce the concept of unbounded decomposable operators on Banach spaces, and extend some main properties of C. Foias' bounded decomposable operators to unbounded decomposable operators. Finally. we prove that unbounded spectral operators in N. Dunford's sense are also unbounded decomposable operators.

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TITLE: "An Investigation of Strengthening Effect of the TZM Alloys"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 66-70

TEXT OF ENGLISH ABSTRACT: In this paper we analyze the strengthening effect of TZM alloys by means of heat treatment, metallographic observations and X-ray phase analysis. It is pointed out that except for a small amount of dispersed carbides, the major parts of Ti and Zr in the alloys give an effect of solution strengthening. The forming of the shapes on the strengthening effect is not obvious. The other parts of the carbides are rich in the grain boundary.

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TITLE: "Theory of Exchange Interactions for Rare-earth Metal Gd"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 71-84

TEXT OF ENGLISH ABSTRACT: Based on the biatomic model and Lowdin's strict definition, the exchange between two electrons on two Gd atoms and on their equal is calculated. Using these data and our approximate model of electronic structure for rare-earth metals, the microscopic Weiss factor of Gd is obtained. The agreement between the calculated and observed Weiss factor is good. The partially local and partially free property of 5*d* electrons is thereby verified.

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TITLE: "Cavities and Fracture during the Superplastic Flow of Zn-Al Eutectoid Alloys"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 85-91

TEXT OF ENGLISH ABSTRACT: This paper investigates the effect of various strain rates and grain sizes on the fracture behavior during the superplastic flow of Zn-Al eutectoid alloys. We have observed the role of form, growth and linkage of cavities during superplastic flow and fracture. Experiments showed that cavities were first formed in the grain and phase boundaries, then these cavities were extended to soft β-phases. As the strain rate and grain size increased, the cavities grew rapidly and, through α-phases, produced interlinkage until fracture occurred. The hard α-phases could inhibit the growth and interlinkage of cavities under some conditions. We have also used the method of X-ray small angle scattering to study the role of cavitation in superplastic flow.

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TITLE: "Studies on the Synthetic Polyarylsulfone Made by Bisphenol Desalting Method in Solution (IV)--Synthetic Polyarylsulfone 004 by New One-step Technology"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 97-102

TEXT OF ENGLISH ABSTRACT: Recapitulated in this paper is a new one-step technology for preparing polyanylsulfone 004 from bisphenol by means of a desalting method in solution. We have compared this new technology to the original one and discussed the properties of the product obtained by substitution of NaOH for KOH. Stabilities of the Na-salt product and K-salt product for decomposition were measured using the TG and DSC techniques. We found that Na-salt product was more stable than the K-salt product for thermal decomposition, so the one-step technique is more reasonable.

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TITLE: "The Relation between the Neighboring Phase Regions and Their Boundaries (III)--The Application of the Theorem of Corresponding Relation in Phase Diagrams to the Phase Diagrams of Quaternary Systems"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 1982 pp 103-111

TEXT OF ENGLISH ABSTRACT: The preceding papers have derived the theorem of corresponding relation between the total number of different phases in the neighboring phase regions (expressed by NPRs) and the dimension of their phase boundaries and its six corollaries in isobaric phase diagrams. This paper applies the above theorem and its corollaries to explain the relation between the NPRs and their boundaries in phase diagrams of quaternary systems. The relation between the NPRs and their boundaries in phase diagrams of quinary systems is also discussed briefly.

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TITLE: "MYBC--A Program Package for the Calculation of One-dimensional Unsteady Flow in Open Channels"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, 1982 pp 1-11

TEXT OF ENGLISH ABSTRACT: MYBC is a program package applicable to river networks with arbitrary geometric and hydraulic characteristics. It is based on the de Saint-Venant system of equations in complete form under nine combinations of upstream and downstream boundary conditions. It provides nine optional and typical methods which are classified into three categories (i.e., the explicit difference scheme, implicit difference scheme and characteristic scheme). The package can be mastered easily for convenient use, and also can be modified, extended and transferred to another computer in a short time due to its modular structure. Particular attention has been laid on its applications for the flow-concentration problem for dendritic river networks. In particular, a general description of dendritic open channel systems by the so-called tree-structured matrix has been proposed, so that MYBC is suitable for any natural watershed, except plex-structured river systems located in plains. Although all nine algorithms were introduced in the literature, improvement has been made in the formulas and their solution, including the correction of

[Continuation of SHUILI XUEBAO No 1, 1982 pp 1-11]

all errors discovered, so as to accelerate the process of machine calculation and extend the spectrum of applications. Numerical simulation for a series of examples has furnished preliminary experience of the performance of each method in stability, accuracy and computational efficiency, and a principle for the selection among various algorithms has been suggested.

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TITLE: "The Optimum Design of Temperature Control for Mass Concrete Dams"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, 1982 pp 12-19

TEXT OF ENGLISH ABSTRACT: In this paper the optimum design of the temperature control for mass concrete dams has been researched by using the nonlinear program. The optimum design considers the minimum relative construction costs as the principle, taking x_1 (the compressive strength of concrete), x_2 (drop placing temperature by adding ice to mix water), x_3 (drop placing temperature by precooling aggregate of concrete), x_4 (drop temperature of concrete by initial cooling), x_5 (number of concrete blocks) and x_6 (the lift thickness of placing) as variables. For some variables which are integral and discontinuous, the problems were solved by mesh method and complex method. FORTRAN-IV computer programs have been made and examples of their application in engineering are given. The program may be widely used in design and construction.

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TITLE: "Computation of the Temperature Field and Temperature Load in Arch Dams. Part II"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, 1982 pp 20-32

TEXT OF ENGLISH ABSTRACT: This subject is divided into two parts. In the first part, which was published in the JOURNAL OF HYDRAULIC ENGINEERING, No 6, 1981, some new formulas for computation of the temperature field in arch dams were given. Based on these formulas, computations of the temperature load in arch dams are discussed in the second part. Several examples are given for discussion of some problems and these examples are compared with practical measured values.

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